Remarks

Claims 1-25 are currently pending in this application.

Applicants respectfully request that the amendments be entered in the specification. The amendments to the specification are of an editorial nature to correct minor typographical errors which occurred during preparation of the application. Applicants respectfully submit that the amendments to the specification do not enter new matter.

The claims have been amended to more fully set forth what Applicants consider to be their invention. Claims 1 and 9 have been amended to indicate that the C_{1-4} alkyl ester of a C_{6-22} saturated or unsaturated carboxylic acid is an ester of a monocarboxylic acid as set forth in the specification at page 5, line 21 through page 6, line 2.

Claims 9 and 32 have been amended to indicate that the composition can contain auxiliaries and optionally a cyclic ketone.

Certain of the claims have been amended to indicate that the particular ingredient comprises the ingredient. Clearly, this is commensurate with the disclosure since the examples show more than one surfactant in the composition and one skilled in the art would understand that the carboxylic acid esters would be prepared from natural products and could contain minor amounts of carboxylic acids outside of the ranges set forth. For this reason, Applicants have substituted the term "comprises" for the term "is", in claims 2, 3, 16. In addition, the term "comprises" has been entered in claims 10, 13, 14, 19 and 34 to indicate that other surfactants can be included into the composition. Applicants respectfully submit that the amendments to the claims are fully supported in the specification and claims as originally filed and no new matter has been entered by way of amendment to the claims.

Applicants respectfully submit that the amendments to the claims be entered at this time since they place the application in condition for allowance or substantially reduce the issues for appeal.

Rejections Under 35 U.S.C. 112

The Examiner states:

> "Concerning the rejections under 112 2nd paragraph, the Applicant makes the argument that although glycol ethers have a low surface tension, the Examiner has not demonstrated that glycol ethers lower the surface tension of water.
>
> "The applicant cites benzene in a compound with low surface tension that is not a surfactant. The Examiner agrees benzene is not a surfactant because it is not water-soluble."

In response to the argument, the Examiner has included a graph demonstrating the dramatic lowering of surface tension with respect to weight % of glycol ether. Applicants submit that the graph appears to show a lowering of the surface tension of water with addition of substantially large amounts of glycol ethers. However, Applicants have not been able to determine the glycol ethers disclosed since they are referred to by letters which Applicants are not able to correlate with a particular glycol ether. In addition, Applicants submit that the lowering of the surface tension is not dramatic in that the best of the alleged glycol ethers which lowers the surface tension of water to about 30 dynes/centimeter requires about 30% by weight of glycol ether. Applicants submit that a reasonably good surfactant would require less than about 0.5% by weight of the surfactant to reduce the surface tension of water to 30 dynes/centimer or less. In addition, the Examiner has not commented on the surface tension of mixtures of ethyl alcohol with water. Applicants submit that one skilled in the art would expect that the surface tension of a mixture of alcohol and water would be different than the surface tension of water just by virtue of the added alcohol. Applicants submit that a person skilled in the art would expect that a 90% solution of alcohol with water would have a surface tension substantially similar to alcohol alone. Applicants submit that the addition of large amounts of the glycol ethers to water would have some effect on the surface tension of the water but would not be the effect which would be afforded by surfactant material which was soluble in the water. Applicants therefore respectfully submit that the showing which the Examiner has provided does not indicate that the glycol ethers whatever their composition in the figure shown are surfactants as known in the art.

Applicants respectfully submit that the Examiner has not shown any scientific reference which indicates that the glycol ethers disclosed in the VanEenam reference are considered surfactants in the art.

As is well known in the art, surfactants have a dramatic effect on the surface tension of water when incorporated into the water in relatively small amounts. The amount of surfactant introduced into a particular composition is dependent upon the properties of the surfactant and, in addition, the amount of water and other materials which are in the composition. Applicants therefore still maintain that the couplers disclosed in VanEenam are known hydrotropes and are not considered nonionic surfactants in the art.

Some of the couplers disclosed in VanEenam such as sodium pelargonate and sodium 2-ethylhexanoate could have surfactant properties but are not the glycol ethers with which Applicants are concerned. Applicants therefore respectfully request that the Examiner reconsider the rejection under 35 U.S.C. 112 2nd paragraph.

In regard to the water solubility of the diacid esters useful in VanEenam, Applicants submit that as amended, the alkyl esters as presently claimed are all water-insoluble materials and do not conform to the solubility requirements of the materials useful in the VanEenam composition.

In particular, the Examiner cites dimethyl esters of mixed succinic, glutaric and adipic acids as having a solubility of 5.7% and as useful as the solvent in the VanEenam composition. Applicants submit that as amended, the esters useful in the practice of the present invention are all monocarboxylic acid esters and the range of carbon atoms in the carboxylic acid moiety coupled with the carbon atoms in the ester moiety provide a material which is insoluble in water. Applicants herewith submit page 761 from Hawley's Condensed Chemical Dictionary, Twelfth Edition, which clearly shows that methyl caproate (6 carbon atom carboxyl acid ester) is insoluble in water and methyl caprylate (a C_8 carboxylic acid) is insoluble in water and methyl caprate (a C_{10} carboxyl acid ester) is also insoluble in water. Applicants therefore respectfully submit that the solvents useful in the practice of the present invention do not fall within the solvents disclosed as useful in VanEenam.

Applicants herewith submit a copy of page 27, 28 from the Merck Index, Ninth Edition, which indicates that cyclohexanone has a solubility in water of 150 g/l at 10°C and 50 g/l at 30°C. The solubility in water of cyclohexanone set forth in the Merck Index is far different than the 2.3 wt.% set forth in VanEenam. According to the Merck Index, the solubility of cyclohexanone in water at about 20°C would be in a range between 15 and 5% by weight and would certainly be above 6% by weight. Applicants therefore respectfully submit that the cyclohexanone solvent of the present invention does not conform to the limit of 6% solubility in water.

Since the claims have been amended to indicate that the carboxylic acid is a monocarboxylic acid, Applicants submit that the solubility of dimethy or diethyl adipate and the dimethyl esters of mixed succinic, glutaric, and adipic acids are not pertinent to the invention as presently claimed.

In view of the amendments to the claims and the above discussion, Applicants respectfully request that the Examiner reconsider the rejection and allow the claims.

Respectfully submitted,

Daniel S. Ortiz

Daniel S. Ortiz
(Reg. No. 25,123)
Attorney For Applicant(s)
215-628-1141

Cognis Corporation
Patent Department
300 Brookside Avenue
Ambler, PA 19002

DSO/mc ORTIZ\M6636A-116am.doc

Enc.

Hawley's

Condensed Chemical

Dictionary

TWELFTH EDITION

Revised by

Richard J. Lewis, Sr.

VAN NOSTRAND REINHOLD COMPANY
New York

cal 95% min.
erous fire and
5-9.1%.
ne fuel manu-

1-2-butene; tri-

uid. Disagree-
1.387 (20C), d
flash p −50F
uble in water.
n, a component

9% (pure), and

gerous fire and

nation, haloge-
reactions.

: angelic acid.

See tiglic acid.

isopropenylace-

nanol.

-68-9.

, bp 91.1C, fp
ash p 35F (1.6C)

fire risk.

).
H_3. 19th-high-
in U.S. (1991).
55C, fp −110C,
ubility in water 4
wt %, heat of va-
kcal/mole), heat
00 Btu/gal (804
alue: 115-125 (re-

of methanol and
0 psi). There are
ss.
fire risk.
ded gasoline (up to
of isobutene. Ap-

pylacetone; 2-hex-
$H_3COC_4H_9$.
bp 127.2C, d 0.830

(20/20C), refr index 1.4024 (20C), vap press 10 mm Hg (20C), soluble in alcohol and ether, flash p 95F (35C) (OC).
Grade: Technical.
Hazard: Flammable, moderate fire risk, explosive limits 1.2-8% in air. Irritant to eyes and mucous membranes, narcotic in high concentration, absorbed by skin. TLV: 5 ppm in air.
Use: Solvent.

2-methyl-6-tert-butylphenol. $(C_6H_3(OH)(CH_3)\text{tert-}C_4H_9)$.
Properties: Crystalline solid, light straw color, mp 28C, d 0.9618 (30C), bp 230C, flash p 220F (104C) (OC). Soluble in methyl ethyl ketone, ethanol, benzene, and isooctane; insoluble in water. Combustible.
Use: Chemical intermediate.

2-methylbutyl-3-thiol. See sec-isoamyl mercaptan.

2-methyl-4-tert-butylthiophenol. (4-tert-butyl-o-thiocresol). $(CH_3)_3CC_6H_3(CH_3)SH$.
Properties: Water-white liquid, no mercaptan odor, d 0.983 (25C), refr index 1.546 (25C), fp −4C, bp 177C (100 mm Hg), soluble in aliphatic and aromatic hydrocarbons, insoluble in water. Combustible.
Use: Chemical intermediate.

methyl butynol. (2-methyl-3-butyn-2-ol). HC═CCOH(CH3)2.
Properties: Colorless liquid with fragrant odor, bp 104-105C, mp 2.6C, d 0.8672 (20/20C), refr index 1.4211 (20C), flash p 77F (25C) (TOC), miscible with water, soluble in most organic solvents.
Grade: Technical, 95% min.
Hazard: Flammable, dangerous fire risk.
Use: Stabilizer in chlorinated solvents, viscosity reducer and stabilizer, electroplating brightener, intermediate.

2-methylbutyraldehyde. (2-methylbutanal). $CH_3CH_2CH(CH_3)CHO$.
Properties: Liquid, d 0.8029 (20/4C), bp 92-93C, refr index 1.3869 (20C), soluble in alcohol and ether, insoluble in water. Combustible.
Use: Flavoring.

3-methylbutyraldehyde. See isovaleraldehyde.

methyl butyrate. CAS: 623-42-7. $CH_3CH_2CH_2COOCH_3$.
Properties: Colorless liquid, slightly soluble in water, soluble in alcohol, d 0.898 (20C), bp 102C, fp −92C, refr index 1.3875 (20C), flash p 57F (14C) (CC).
Grade: Technical.
Hazard: Flammable, dangerous fire risk.
Use: Solvent for ethylcellulose, solvent mixture for nitrocellulose, flavoring.

2-methylbutyric acid. See isopentanoic acid.

3-methylbutyric acid. See isopentanoic acid.

methyl caprate. (methyl decanoate). $CH_3(CH_2)_8COOCH_3$.
Properties: Colorless liquid, d 0.8733 (20/4C), fp −13.3C, bp 224C, 130.6C (30 mm Hg), refr index 1.4237 (25C), insoluble in water, soluble in alcohol and ether. Combustible.
Derivation: Esterification of capric acid with methanol or alcoholysis of coconut oil, purified by fractional vacuum distillation.
Grade: Technical, 99.8% pure.
Use: Intermediate for detergents, emulsifiers, wetting agents, stabilizers, resins, lubricants, plasticizers.

methyl caproate. (methyl hexanoate). CAS: 106-70-7. $CH_3(CH_2)_4COOCH_3$. The methyl ester of caproic acid.
Properties: Colorless liquid, d 0.8850 (20/4C), fp −71C, bp 151.2C, 63.0C (30 mm Hg), refr index 1.4054 (20C), insoluble in water, soluble in alcohol and ether. Combustible.
Derivation: Esterification of caproic acid with methanol or alcoholysis of coconut oil.
Grade: Technical, 99.8+%.
Use: Intermediate for caproic acid detergents, emulsifiers, wetting agents, stabilizers, resins, lubricants, plasticizers, flavoring.

methyl caprylate. (methyl octanoate). $CH_3(CH_2)_6COOCH_3$. The methyl ester of caprylic acid.
Properties: Colorless liquid, d 0.8784 (20/4C), fp −37.3C, bp 192C (759 mm Hg), 98.3 (30 mm Hg), refr index 1.4152 (25C), insoluble in water, soluble in alcohol and ether. Combustible.
Derivation: (1) Esterification of caprylic acid with methanol, (2) alcoholysis of coconut oil.
Grade: Technical, 99.8%.
Use: Intermediate for caprylic acid detergents, emulsifiers, wetting agents, stabilizers, resins, lubricants, plasticizers, flavoring.

methyl "Carbitol" [*Union Carbide*]. TM for diethylene glycol monomethyl ether.

methyl "Carbitol" acetate. TM for diethylene glycol monomethyl ether acetate.

methyl carbonate. (dimethyl carbonate). CAS: 616-38-6. $CO(OCH_3)_2$.
Properties: Colorless liquid, pleasant odor, miscible with acids and alkalies, stable in the presence of water, soluble in most organic solvents,

insoluble in water, d 1.0718 (20C), bp 90.6C, mp 0C.
Derivation: Interaction of phosgene and methanol.
Grade: Technical.
Hazard: Flammable, dangerous fire risk. Toxic by inhalation, strong irritant.
Use: Organic synthesis, specialty solvent.

methyl "Cellosolve" [*Union Carbide*]. TM for ethylene glycol monomethyl ether.

methyl "Cellosolve" acetate [*Union Carbide*]. TM for ethylene glycol monomethyl ether acetate.

methylcellulose. (cellulose methyl ether; "Methocel"). CAS: 9004-67-5.
Properties: Grayish-white, fibrous powder; aqueous suspensions neutral to litmus; swells in water to a viscous colloidal solution; insoluble in alcohol, ether, chloroform, and in water warmer than 50.5C; soluble in glacial acetic acid; unaffected by oils and greases; stable up to approximately 300C; stable to light. Combustible.
Molecular weights vary from 40,000 to 180,000. Specifications call for methoxy group content of narrow or wide ranges within 25-33%.
Derivation: From cellulose by conversion to alkali cellulose and then reacting this with methyl chloride, dimethyl sulfate, or methanol and dehydrating agents. The proportions of the reacting materials are varied to control the properties of the product, such as water solubility and viscosity of water solutions.
Grade: USP, technical, FCC.
Use: Protective colloid in water-based paints to prevent flocculation of pigment; film and sheeting; binder in ceramic glazes; leather tanning; dispersing, thickening, and sizing agent; adhesive; food additive.
See also cellulose, modified; carboxymethylcellulose, hydroxyethylcellulose.

methylcellulose, propylene glycol ether. See hydroxypropyl methylcellulose.

methyl cerotate. (methyl hexacosanoate). $CH_3(CH_2)_{24}COOCH_3$. The methyl ester of cerotic acid.
Properties: Wax-like solid, insoluble in water, soluble in alcohol and ether, mp 62.9C, bp 237C (1.95 mm Hg), refr index 1.4301 (80C). Combustible.
Derivation: Esterification of cerotic acid with methanol.
Grade: Purified (99+%).
Use: Intermediate in special synthesis, medical research, reference standard for gas chromatography.

methyl chloride. (chloromethane; monochloromethane). CAS: 74-87-3. CH_3Cl.
Properties: Colorless compressed gas or liquid, faintly sweet, ethereal odor, d 0.92 (20C), bp −23.7C, fp −97.6C, flash p approximately 32F (0C), refr index 1.3712 (−23.7C), critical temperature 143C, critical pressure 970 psi absolute, autoign temp 1170F (632C), bulk d 7.68 lb/gal (20C). Slightly soluble in water, by which it is decomposed; soluble in alcohol, chloroform, benzene, carbon tetrachloride, glacial acetic acid; attacks aluminum, magnesium, and zinc.
Derivation: (1) Chlorination of methane, (2) action of hydrochloric acid on methanol either in vapor or liquid phase.
Grade: Pure (99.5% min), technical, and two refrigerator grades.
Hazard: Flammable, dangerous fire risk, explosive limits in air 10.7-17%. Narcotic. Psychic effects. TLV: 50 ppm in air.
Use: Catalyst carrier in low-temperature polymerization (butyl rubber), tetramethyl lead, silicones, refrigerant, fluid for thermometric and thermostatic equipment, methylating agent in organic synthesis, such as that of methylcellulose, extractant and low-temperature solvent, herbicide, topical anesthetic.

methyl chloroacetate. CAS: 96-34-4. $ClCH_2COOCH_3$.
Properties: Colorless liquid with sweet pungent odor, d 1.236 (20/4C), fp −32.7C, bp 131C, refr index 1.419-1.420 (25C), insoluble in water, miscible with alcohol and ether. Combustible.
Hazard: Toxic by ingestion and inhalation.
Use: Solvent, intermediate.

methyl chloroform. See 1,1,1-trichloroethane.

methyl chloroformate. (methyl chlorocarbonate). CAS: 79-22-1. $ClCOOCH_3$.
Properties: Colorless liquid, decomposed by hot water, stable to cold water. Soluble in methanol alcohol, ether, and benzene. D 1.23 (15C), bp 71.4C, vapor d 3.9 (air = 1), flash p 54F (12.2C).
Derivation: Reaction between methanol and carbonyl chloride.
Grade: Technical (95% min).
Hazard: Flammable, dangerous fire risk. Highly corrosive and irritant to skin and eyes.
Use: Military poison (lachrymator), organic synthesis, insecticides.

methylchloromethyl ether. (chloromethyl methyl ether). CAS: 107-30-2. $ClCH_2OCH_3$.
Properties: Colorless liquid, d 1.0625 (10/4C), fp −103.5C, bp 59.5C, decomposes in water, soluble in alcohol and ether.
Hazard: Flammable, dangerous fire and explo-

sion risk. Toxic
Suspected huma

2-methyl-4-chloro
MCPA.

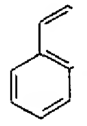
4-(2-methyl-4-chlo
4-MCPB.

2-(2-methyl-4-chlo
See mecoprop.

methyl chlorosilan
One of several i
silicones or silo
groups on many
permanent thin
parts water-rep
trichlorosilane,
methylchlorosila
Hazard: Toxic
strong irritant t

methyl chlorosulf
Properties: Colo
composed by w
tetrachloride, c
1.492 (10C), b
−70C, vap d 4.
Derivation: Inter
methanol.
Grade: Technical
Hazard: Highly
tion, strong irrit
Use: Organic syn

methylcholanthre
A polynuclear h



Properties: Yello
ble in benzene, i
Derivation: Fro
cene.
Hazard: Powerf
Use: Biochemica

methyl cinnamate
$C_6H_5CH:CHC$
Properties: Whit
d 1.0415, mp 34
and ether, in gl
eral oil; insolub

THE
MERCK INDEX

AN ENCYCLOPEDIA OF
CHEMICALS AND DRUGS

NINTH EDITION

Martha Windholz, *Editor*
Susan Budavari, *Associate Editor*
Lorraine Y. Stroumtsos, *Assistant Editor*
Margaret Noether Fertig, *Assistant Editor*

Published by
MERCK & CO., INC.
RAHWAY, N.J., U.S.A.

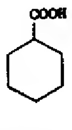
1976

2728. Cyclohexane. Hexahydrobenzene; hexamethylene; hexanaphthene. C_6H_{12}; mol wt 84.16. C 85.63%, H 14.37%. Occurs in petr (0.5-1.0%). Obtained in the distillation of petr or by hydrogenation of benzene. In the distillation of petr the C_4-400°F boiling range naphthas are fractionated to obtain a C_5-200°F naphtha contg 10-14% cyclohexane which on superfractionation yields an 85% concentrate (which is sold as such); further purification necessitates isomerization of pentanes to cyclohexane, heat cracking for removing open chain hydrocarbons and sulfuric acid treatment to remove aromatic compds. The hydrogenation of benzene is done in the liq phase at 150° using Raney nickel catalyst and at least 10 atm H_2 pressure: Sabatier, *Ind. Eng. Chem.* **18,** 1005 (1926). Review and bibliography: Sachanen, *Chemical Constituents of Petroleum* (New York, 1945). Prepn of high purity cyclohexane: Seyer *et al., Ind. Eng. Chem.* **31,** 759 (1939). Cyclohexane can exist in two interconvertible conformations, the boat and the chair. In the chair form its 12 extracyclic bonds fall into two classes: six lie parallel to the main axis of symmetry and are designated "axial", while six extend radially outward at ±109.5° angles to the axis and are designated as "equatorial", Barton *et al., Nature* **172,** 1096 (1954); *Science* **119,** 49 (1954). Physical properties and methods of purification: L. Scheflan, M. B. Jacobs, *The Handbook of Organic Solvents* (Van Nostrand, 1953) p 233; *Techniques of Chemistry,* A. Weissberger, Ed., vol. II, 3rd ed., entitled "*Organic Solvents*" by J. D. Riddick, W. B. Bunger (Wiley-Interscience, New York, 1970) p 592. *Review:* Kirk in Kirk-Othmer *Encyclopedia of Chemical Technology,* vol. 6 (Interscience, New York, 2nd ed. 1965) pp 675-682.

Flammable liq. Solvent odor. Pungent when impure. d_4^{20} 0.7781; d_4^{80} 0.7206. mp +6.47°. bp_{760} 80.7°; bp_{400} 60.8°; bp_{200} 42.0°; bp_{100} 25.5°; bp_{60} 14.7°; bp_{40} 6.7°. n_D^{20} 1.4264. Flash pt −18° (0°F). Flammability limits in air 1.3-8.4% v/v. Practically insol in water; 100 ml of methanol dissolves 57 grams at 20°C; miscible with ethanol, ethyl ether, acetone, benzene, carbon tetrachloride. Lethal concn for mice: about 60-70 mg/l in air, Lazarew, *Arch. Exp. Pathol. Pharmacol.* **143,** 223 (1929).

USE: Solvent for lacquers and resins. Paint and varnish remover. In the extraction of essential oils. In analytical chemistry for mol wt determinations (cryoscopic constant 20.3). In the manuf of adipic acid, benzene, cyclohexyl chloride, nitrocyclohexane, cyclohexanol and cyclohexanone. In the manuf of solid fuel for camp stoves. In fungicidal formulations (possesses slight fungicidal action). In the industrial recrystn of steroids. *Caution:* High concns may act as narcotic, skin irritant: E. Browning, *Toxicity and Metabolism of Industrial Solvents* (Elsevier, New York, 1965) pp 130-134.

2729. Cyclohexanecarboxylic Acid. Hexahydrobenzoic acid. $C_7H_{12}O_2$; mol wt 128.17. C 65.59%, H 9.44%, O 24.97%. Prepn from anisic acid: Lumsden, *J. Chem. Soc.* **87,** 90 (1905); from 2-chlorocycloheptanone: Gutsche, *J. Am. Chem. Soc.* **71,** 3513 (1949); by carbonation of cyclohexylmagnesium chloride: Wagner, Moore, *ibid.* **72,** 974 (1950); from cyclohexane + KI + active Ni: Reppe *et al., Ann.* **582,** 38 (1953); by oxidation of cycloheptanone: Payne, Smith, *J. Org. Chem.* **22,** 1680 (1957); from cyclohexane + HCOOH or CO_2: McKursick *et al., J. Am. Chem. Soc.* **82,** 723 (1960); McKursick, U.S. pat. **2,940,913** (1960 to du Pont).

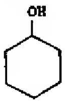


Liquid. bp 232.5°; bp_{20} 131°; bp_8 110°; $bp_{<1}$ 63-67°. Crystallizes, on cooling, in monoclinic prisms, mp 29°. Odorless but when liq or in soln has a valerian odor. d_4^{15} 1.0480. n_D^{20} 1.4530. Soly in 100 g water at 15°: 0.201 g. Sol in most organic solvents.

Methyl ester, $C_8H_{14}O_2$, fragrant liq, bp 183°. d_4^{15} 0.9954.

USE: Solubilizer for vulcanized rubber; clarifier for mineral oil; in insecticide formulations.

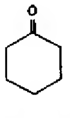
2730. Cyclohexanol. Hexalin; hexahydrophenol. $C_6H_{12}O$; mol wt 100.16. C 71.95%, H 12.08%, O 15.97%. Obtained by hydrogenation of phenol.



Hygroscopic crystals; camphor odor. d^{20} 0.962. mp 23-25°. bp 161°. Flash pt 68°. n_D^{22} 1.465. At 20° soly in water: 3.6% (w/w); soly of water in cyclohexanol: 11% (w/w). Miscible with ethanol, ethyl acetate, linseed oil, petr solvents, aromatic hydrocarbons.

USE: Solvent for alkyd resins, alcohol-sol phenolic resins, ethyl cellulose. Manuf celluloid; finishing textiles; insecticides. *Caution:* Narcotic-like action. Has caused liver, kidney, vascular injury in exptl animals: E. Browning, *Toxicity and Metabolism of Industrial Solvents* (Elsevier, New York, 1965) pp 385-388.

2731. Cyclohexanone. Ketohexamethylene; pimelic ketone; Hytrol O; Anone; Nadone. $C_6H_{10}O$; mol wt 98.14. C 73.43%, H 10.27%, O 16.30%. Obtained from cyclohexanol by catalytic dehydrogenation or by oxidation (which yields cyclohexanone and adipic acid) or from cyclohexane by oxidation (yielding cyclohexanone and cyclohexanol); Brit. pat. **310,055** (1928 to Schering-Kahlbaum); U.S. pats. **2,223,493-4** and **2,285,914** (1940, 1942 to du Pont).



Oily liq. Odor reminiscent of peppermint and acetone. *Caution:* Vapor harmful. d_4^{20} 0.9478; d_4^{25} 0.9421. fp −32.1°. bp_{760} 155.6°; bp_{400} 132.5°; bp_{200} 110.3°; bp_{100} 90.4°; bp_{60} 77.5°; bp_{40} 67.8°; bp_{20} 52.5°; bp_{10} 38.7°; bp_5 26.4°; $bp_{1.0}$ 1.4°. n_D^{20} 1.4507. Flash pt 63° (147°F). Soly in water: 150 g/l at 10°; 50 g/l at 30°. Soly of water in cyclohexanone: 87g/l at 20°. Sol in alcohol, ether and in other common organic solvents. LD_{50} orally in rats: 1.62 ml/kg, Smyth *et al., Am. Ind. Hyg. Assoc. J.* **30,** 470 (1969).

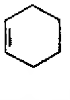
Oxime, prisms, mp 89-90°.

Semicarbazone, mp 166-167°.

2,4-Dinitrophenylhydrazone, mp 160°.

USE: Solvent for cellulose acetate, nitrocellulose, natural resins, vinyl resins, crude rubber, waxes, fats, shellac, DDT. In the production of adipic acid for nylon. In the prepn of cyclohexanone resins.

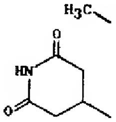
2732. Cyclohexene. 1,2,3,4-Tetrahydrobenzene. C_6H_{10}; mol wt 82.14. C 87.73%, H 12.27%. Occurs in coal tar. Prepd by dehydration of cyclohexanol at high temps over various catalysts. Lab prepn using H_2SO_4 as dehydrating agent: Coleman, Johnstone, *Org. Syn.* **5,** 33 (1925); Wagner, *J. Chem. Ed.* **10,** 113 (1933); by distn of cyclohexanol over silica gel or alumina: Hershberg, Ruhoff, *Org. Syn.* **17,** 25 (1937).



Liquid. d_4^{20} 0.8098; d^{50} 0.7823; d^{100} 0.7355. fp −103.5°. bp_{760} 83°. n_D^{20} 1.4465; n_D^{27} 1.4428. Absorption spectrum: Purvis, *Proc. Cambridge Phil. Soc.* **23,** 588 (1927); *Chem. Zentr.* **1927,** II, 379; *cf.* Hartley, Dobbie, *J. Chem. Soc.* **77,** 846 (1900).

USE: Alkylation component
maleic acid, hexahydrobenzoic
pare butadiene in the laborator
synthesis of maleic acid and
gasoline.

2733. Cycloheximide. 4-
hexyl)-2-hydroxyethyl]-2,6-pi
methyl-2-oxocyclohexyl)-2-hy
mycin A; Actidione. $C_{15}H_{23}N$
H 8.24%, N 4.98%, O 22.75%.
from the beers of streptomycin
myces griseus: Ford, Leach,
(1948); Whiffen *et al.,* U.S. pat
Production, assay and antibio
teriol. **56,** 283 (1948). Struct
Chem. Soc. **71,** 150 (1949). A
braun *et al., ibid.* **80,** 1261 (195
rahedron Letters **1962,** 1173;
Soc. **87,** 4612 (1965). Synthesi
et al., ibid. **88,** 149 (1966).

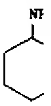


Plates from amyl acetate or
119.5-121°. $[\alpha]_D^{29}$ −3.38° (c =
(c = 2 in H_2O). Soly in water
acetate at 2° = 7 g/100 ml.
acetone, methanol, ethanol, oth
except satd hydrocarbons.
stable, destroyed by boiling in
shows no loss of activity after
not destroyed by boiling for
room temp by dil alkali with
fragrant ketone, 2,4-dimethylc
mice: 150 mg/kg; orally in
Toxic Substances List, H. E. C
Extremely repellant to rats.

Acetate, $C_{17}H_{25}NO_5$, glistenin
148-149°. $[\alpha]_D^{25}$ +22° (c = 2.3

USE: Fungicide, esp for the c
diseases, and rose powdery mil

2734. Cyclohexylamine. C
hexane; hexahydroaniline.
72.66%, H 13.21%, N 14.12%.
genation of aniline at elevated
distillation of the crude reaction
amine, unchanged aniline, and
N-phenylcyclohexylamine (cyc
hexylamine. Review and bibli
Ind. Eng. Chem. **29,** 1247 (193



Liquid. Strong, fishy, amine
17.7°. bp_{760} 134.5°; bp_{500} 11
[illegible] 30.0°; bp_{30} 45.1°; bp_{25} 41.3
1.4565 Strong base. Complet
with common organic solvents
ketones, esters, aliphatic hydroc
[illegible] and their chlorinated deri
[illegible] cyclohexylamine forms a
[illegible] 96.4° at 760 mm and contg
[illegible] Reacts with excess am
[illegible] to produce α-picoline: N
[illegible] into Pyridine Bases, O
[illegible] LD_{50} i.p. in rats: 200 m
[illegible] I, W. S. Spector, Ed. (S
[illegible]